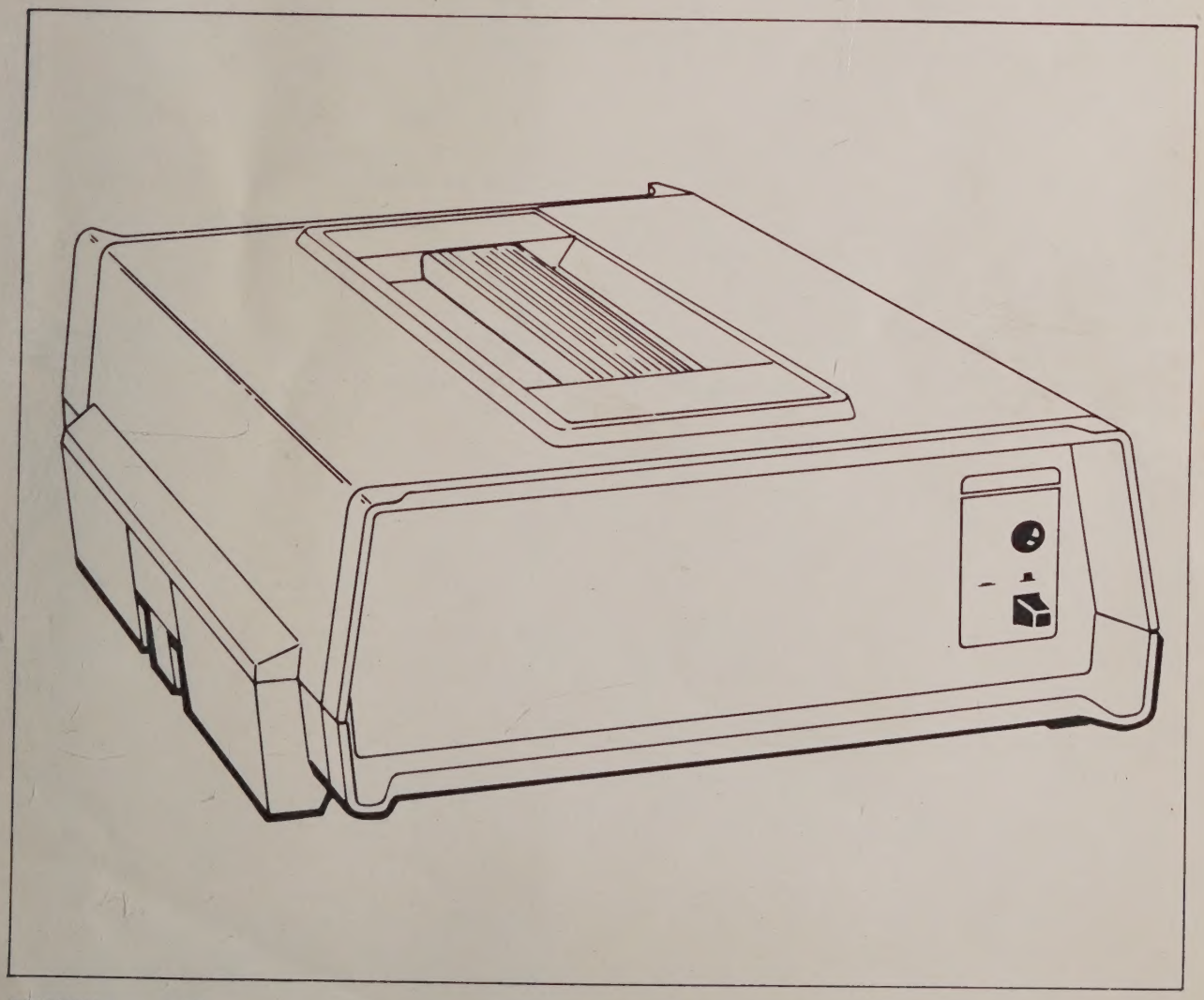
FLUKE®

Instruction Manual

Model Y2009

Battery Charger



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Y2009

LIMITED WARRANTY

The JOHN FLUKE MFG. CO., INC., warrants each instrument it manufactures to be free from defects in material and workmanship under normal use and service for the period of one year from date of purchase. This warranty extends only to the original purchaser. This warranty shall not apply to fuses, disposable batteries (rechargeable type batteries are warranted for 90 days), or any product or parts which have been subject to misuse, neglect, accident or abnormal conditions of operations.

In the event of failure of a product covered by this warranty, John Fluke Mfg. Co., Inc., will repair and calibrate an instrument returned to an authorized Service Facility within one year of the original purchase; provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may, at its option, replace the product in lieu of repair. With regard to any instrument returned within one year of the original purchase, said repairs or replacement will be made without charge. If the fault has been caused by misuse, neglect, accident or abnormal conditions of operations, repairs will be billed at a nominal cost. In such case, an estimate will be submitted before work is started, if requested.

ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS SHALL BE LIMITED TO A PERIOD OF TWELVE MONTHS FROM THE DATE OF PURCHASE. THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. JOHN FLUKE MFG. CO., INC. SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT OR OTHERWISE.

NOTE: Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

If any fault develops, the following steps should be taken:

1. Notify the John Fluke Mfg. Co., Inc. or nearest Service facility, giving full details of the difficulty, and include the Model number, type number, and serial number. On receipt of this information, service data or shipping instructions will be forwarded to you.

2. On receipt of the shipping instructions, forward the instrument, transportation prepaid. Repairs will be made at the Service Facility and the instrument returned, transportation prepaid.

SHIPPING TO MANUFACTURER FOR REPAIR OR ADJUSTMENT

All shipments of John Fluke Mfg. Co., Inc., instruments should be made via United Parcel Service or "Best Way*" prepaid. The instrument should be shipped in the original packing carton; or if it is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material.

CLAIM FOR DAMAGE IN SHIPMENT TO ORIGINAL PURCHASER

The instrument should be thoroughly inspected immediately upon original delivery to purchaser. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the instrument is damaged in any way, a claim should be filed with the carrier immediately. (To obtain a quotation to repair shipment damage, contact the nearest Fluke Technical Center.) Final claim and negotiations with the carrier must be completed by the customer.

The John Fluke Mfg. Co., Inc. will be happy to answer all application or use questions, which will enhance your use of this instrument. Please address your requests or correspondence to: JOHN FLUKE MFG. CO., INC., P.O. Box 43210, MOUNTLAKE TERRACE, WASHINGTON 98043, Atten: Sales Dept. For European Customers: FLUKE (Nederland) B.V., Zevenheuvelenweg 53, Tilburg, The Netherlands.

* For European customers, Air Freight prepaid.

John Fluke Mfg. Co., Inc. • P.O. Box 43210 • Mountlake Terrace, Washington 98043

Rev. 12/77

INTRODUCTION

The Model Y2009 is a rechargeable battery pack and charging unit that maintains a constant 12V dc output. The Y2009 was designed to be used primarily with the Models 2190A or 2180A Digital Thermometers, it will, however, be completely compatible with any instrument that operates on 12V dc, 750 mA max. When the battery pack is fully charged it will allow the 2190A, 2180A to operate as portable instruments for up to six hours. Use of nickel cadmium batteries assure a constant output over the batteries' entire capacity. The Y2009 also provides a unique load removal/low battery indicator circuit which protects the battery pack from deep discharge as well as giving a visual indication of low battery charge.

SPECIFICATIONS

Electrical

Output: 12V dc, 750 mA max.
Rated Capacity: 2.2 Amp/hr.
Recharge Time: 16 hours typical at 25°C.

General

Battery Type: 10, Ni-cad 1/2 D size cell (fully encapsulated in a drip-proof case).
Battery Charger: Internal, with automatic low battery cut-off circuit.
Output Connection: Rear panel screw terminal block.
Power Requirements: Switch selectable for 100, 120, 200 or 240 volts ac ±10%, 50 to 400 Hz.
B Size (PTI): 8.20 cm H x 20.45 cm W x 32.64 cm D. (2.25 in H x 8.05 in W x 12.85 in D.)
Weight: 2.61 kg; 5 lbs. 12 oz.
Fuse Type:
AC Line, 100/120V 1/8 amp, slo-blo, 250 MDL.
AC Line, 200/240V 1/16 amp, slo-blo, 250 MDL.
DC Output, 12V 3/4 amp, slo-blo, 250 MDL.

Environmental

Operating/Storage Temperature: 0 to 40°C.
Shock and Vibration: Meets requirements of MIL standard 810.
Humidity: 0 to 50°C (32 to 122°F) 80% non-condensing. 0 to 35°C (32 to 95°F) 90% non-condensing.

SHIPPING INFORMATION

The Y2009 is packaged and shipped in a foam packed container. Upon receipt of the instrument, a thorough inspection should be made to reveal any possible shipping damage. Special instructions for inspection and claims are included in the shipping carton.

If reshipment is necessary and the original container is not available a new one can be obtained by writing the John Fluke Mfg. Co., Inc. Please reference the instrument model number (Y2009) when requesting a new shipping container.

Input Power

The Y2009 may be charged from any one of four line voltages. THE Y2009 WILL NOT OPERATE WHILE IT IS BEING RECHARGED.

AC Line Voltage

The Y2009 may be charged from one of four switch selectable ac line voltages. These are: 100, 120, 200 and 240V ac ±10%, 50 to 400 Hz. The source selecting switches are located on the Y2009's Main PCB and may be accessed by removing the Y2009's top cover, see Figure 1. Figure 1 also indicates all possible switch positions for the compatible charging voltages. Before connecting the Y2009 to the ac line, check to ensure that the instrument is wired to accomodate the local line voltage. A decal on the rear of the Y2009 defines the particular line voltage for which it has been factory selected to charge.

The rear panel ac input is a three-prong U-ground receptacle which permits the Y2009 to be connected, via the power cord, to the appropriate line voltage. The offset prong on this receptacle is connected to the Y2009's power supply and should be tied through the power cord to a high quality earth ground.

External 12V dc Output

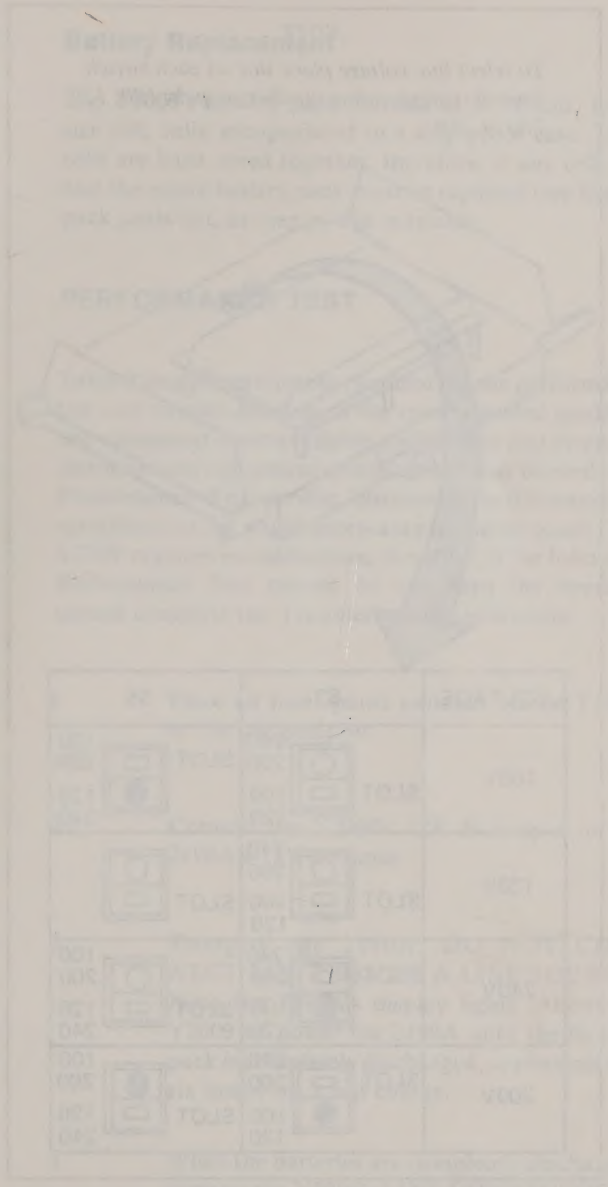
The 12V dc output is the only output on the Y2009. It is a two screw terminal block located on the Y2009's rear panel and labeled "12 VDC". To access this output, use a #18 2 connector wire.

OPERATING FEATURES

The location of all Y2009 controls, indicators and connectors are shown in Figure 2 and described in Table 1.

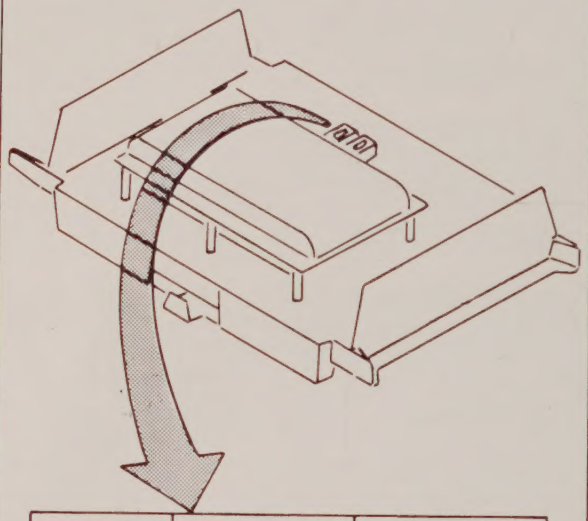
OPERATING NOTES

The following paragraphs contain information regarding the installation and operation of the Y2009. It is recommended that the following paragraphs be read before any attempt is made to operate the instrument. Should any difficulties arise during operation, please contact your nearest Fluke Techical Service Center, or the John Fluke Mfg. Co., Inc., P.O. Box 43210, Mountlake Terrace, WA 98043, Tel; (206) 774-2211. A list of the Technical Service Centers is given at the rear of this manual.



NOTE

To select line voltage place slot on each switch toward corresponding number on pcb; 100, 120, 200 or 240.



VOLTAGE	S2	S5
100V	SLOT 240 200 100 120	SLOT 100 200 120 240
120V	SLOT 240 200 100 120	SLOT
240V	SLOT 240 200 100 120	SLOT 100 200 120 240
200V	SLOT 240 200 100 120	SLOT 100 200 120 240

Figure 1. Source Selection

Installation Compatibility

The Y2009 is housed in a B size PTI (Portable Test Instrument) case and has one output, 12V dc. The 12V dc output may be connected to any instrument (to provide portable operation) which is compatible with 12V dc, 750 mA max.

Installation

To provide portable operation for any compatible instrument simply connect the desired instruments +/-12V dc input via the #18 two connector wire to the Y2009's +/-12V dc output and place the Y2009's front panel ON/OFF switch to the OFF position. To charge the Y2009's battery pack connect a compatible voltage source (see AC Line Voltage) to the Y2009's input connector and place the Y2009's front panel ON/OFF switch to the ON position. Allow the Y2009 to charge for typically 16 hours at 25°C.

NOTE

The Y2009's 12V dc output will not be operational while the battery pack is being charged.

Fuse Replacement

The Y2009 uses two in line fuses. The ac line fuse (F1) which protects the power supply and the dc output fuse (F2) which protects the battery pack. Both fuses may be accessed at the instrument's rear panel. When replacing either fuse, check the instrument's rear panel fuse decal and replace with the appropriate fuse.

Low Battery (LO BTRY) Indicator

The low battery indicator is the only indicator on the Y2009. This indicator is a front panel LED which lights to indicate that the battery pack needs to be recharged. This indicator also provides a continuous battery discharge to prevent memory effect, see Theory of Operation.

OPERATION

The Y2009 is completely self regulating and requires no operating instructions. If the Y2009 fails to operate correctly refer to the Performance Tests and Troubleshooting information within this manual.

THEORY OF OPERATION

The Model Y2009 is a rechargeable battery pack that consists of a power supply/battery charger and a battery pack. The battery pack utilizes sealed, multi-celled, nickel cadmium, rechargeable batteries. Basically, this type of battery is characterized by a flat voltage discharge curve and extremely long cycle life. However, if these batteries are allowed to discharge at a high rate, there is a risk of reverse charging also if they are not discharged completely the batteries may develop a phenomena called memory effect. (Memory effect is simply a ni-cad battery that has lost part of its charge capacity due to repeated discharging to the same level.) These problems have been overcome by utilizing a load removal circuit and continuous low level discharge. The LOW BTRY indicator provides a continuous (when on) low level discharge as well as an indication of low battery charge.

The load removal circuit will automatically remove the load from the battery pack whenever the battery charge drops below a set reference level, thus eliminating the possibility of a high rate discharge. These circuits are described briefly in the following paragraphs and shown in Figure 3.

A reference level, which determines when the load will be disconnected is set by a reference zener. In normal battery operation, Q1 is closed, Q2 is open, S1A is closed, S1C is open (charger off) and power is being delivered to the load. At this point, V1 will be greater that Vref, forcing the output of the comparator U1B low and closing Q1. As the battery discharges, Vbatt will become smaller and eventually V1 will equal Vref. Now the comparator U1A opens, Q1 and V3 drops to zero. U1B will now close Q2, applying the residual battery voltage across CR1 to ground (eliminating memory effect). CR1 will remain lit until the residual battery voltage drops below the operating voltage of the comparator U1B or below the forward drop of CR1.

To reset the circuit, the user closes S1C which opens S1A and applies charge current to the battery pack. When Vbatt becomes greater than Vref the comparator U1A will close Q1 causing V3 to become greater than Vref. Consequently, U1B will open Q2 and the low battery indicator will turn off.

WARNING

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

GENERAL MAINTENANCE

The following paragraphs provide information about general maintenance, performance testing and troubleshooting. The performance test is recommended when the Y2009 is received and later as a preventive maintenance tool or for testing after repair. Troubleshooting and/or component replacement should be done only if the performance test indicates that it is necessary.

Access Information

To gain access to the interior of the Y2009 simply remove the four #6-32 phillips screws located on the bottom of the instrument and lift the top cover straight up.

Battery Replacement

The Y2009's battery pack consists of 10 Ni-cad, 1/2 D size cell, fully encapsulated in a drip-proof case. These cells are hard wired together, therefore, if any cell goes bad the entire battery pack must be replaced (see battery pack parts list, at rear of this manual).

PERFORMANCE TEST

Table 2 lists the equipment required for the performance test and troubleshooting. If the recommended model of test equipment is not available, a substitute that meets the minimum test equipment specifications may be used. The Performance Test verifies instrument performance to specifications for initial acceptance or maintenance. The Y2009 requires no calibration, therefore, if the following Performance Test cannot be met then the operator should complete the Troubleshooting procedure.

1. Place all front panel switches on the Y2009 to the out position.

2. Connect the Y2009's 12V dc output to the 2190A's 12V dc input.

3. Energize the 2190A, DO NOT CONNECT THE 2190A TO A LINE SOURCE. Note the 2190A's display lights. Allow the Y2009 to power the 2190A until the battery pack is completely discharged, approximately six hours on a full charge.

4. When the batteries are completely discharged connect the Y2009's LINE CONNECTOR to the variac output. Check Y2009's source selecting switches to assure that Y2009 is compatible with the variac output.

5. Decrease variac's output by 10% and depress CHARGER POWER switch to its ON (in) position. Note that initially the LO BTRY indicator is lit.

6. If the battery charger is operating properly the LO BTRY indicator will become dimmer and eventually go out in less than 30 minutes. If, however, the indicator remains lit or does not initially light at all, the battery charger will require troubleshooting.

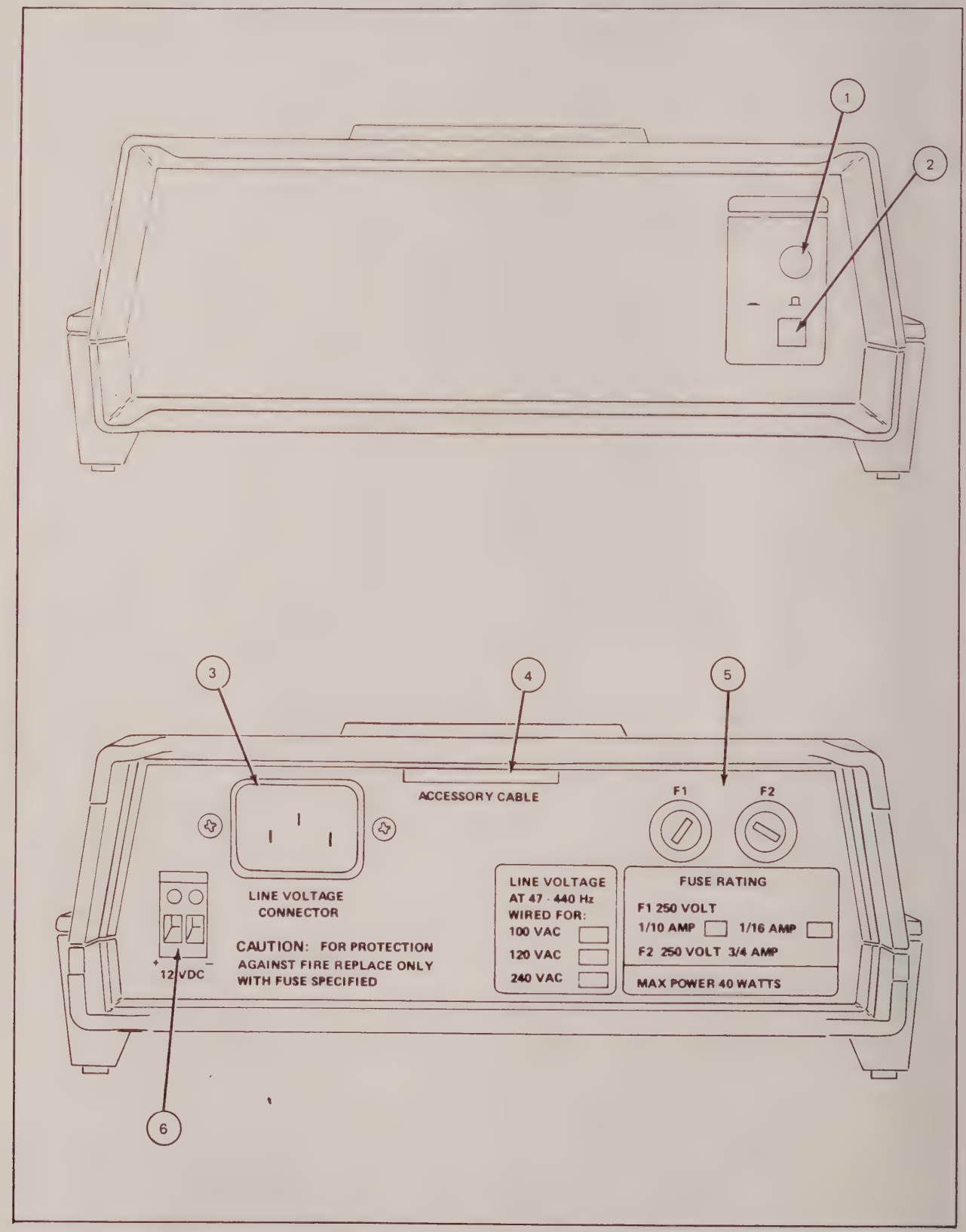


Figure 2. Controls, Indicators and Connectors

Table 1. Controls, Indicators and Connectors

ITEM	NAME	FUNCTION
1	LO BTRY	An LED which lights to indicate that the battery pack requires charging.
2	ON/OFF	A push-push button which connects/disconnects the battery charger to the line source. In = charger enabled, 12V dc output disabled. Out = charger disabled, 12V dc output enabled.
3	LINE VOLTAGE CONNECTOR	A three-prong receptacle which allows the Y2009 to be connected to a compatible line source.
4	ACCESSORY CABLE	Not used.
5	F1, F2	In line fuses, F1 is the ac line fuse, F2 is the battery pack fuse.

TROUBLESHOOTING

A troubleshooting guide for the Y2009 is given in Table 3. Its completion requires that the Y2009's top cover be removed while the instrument is connected to a line source. It is, therefore, recommended that only qualified personnel perform the following troubleshooting procedure.

Line Voltage Points

WARNING

WHEN TROUBLESHOOTING THE Y2009 THE TECHNICIAN SHOULD BE AWARE THAT THE FOLLOWING POINTS WILL BE AT LINE POTENTIAL.

1. REAR PANEL LINE VOLTAGE CONNECTOR.
2. FUSES, F1 AND F2.
3. PRIMARY ON TRANSFORMER T1 AND ASSOCIATED LAND PATTERNS.

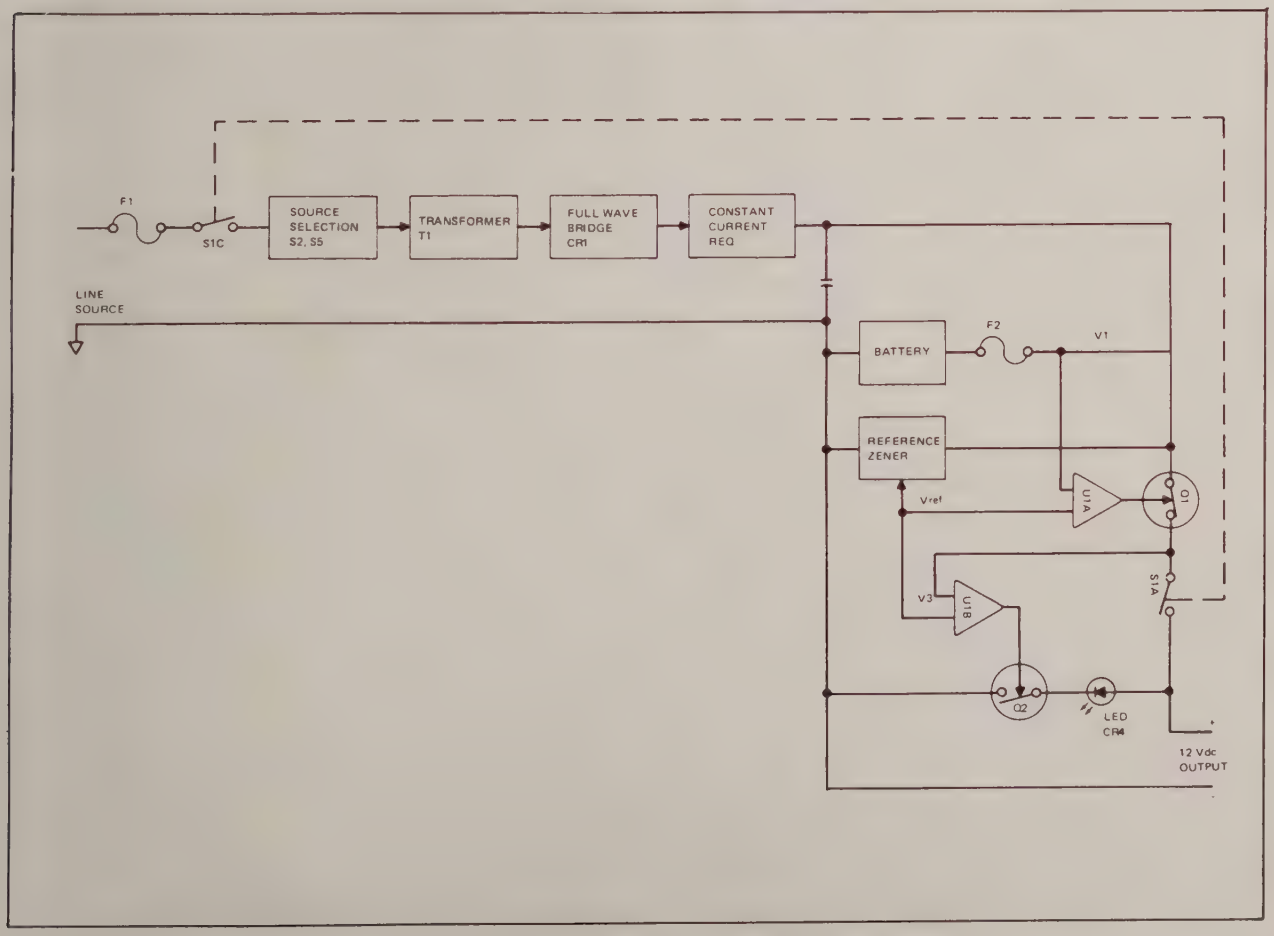


Figure 3. Load Removal/Low Battery Indicator Circuit

4. SOURCE SELECTING SWITCHES, S1, S5 AND ASSOCIATED LAND PATTERNS.
5. CHARGER POWER SWITCH S1.

Set Up Procedure

The following steps are intended to help the technician determine that the fault actually exists within the Y2009. These steps should be completed before any troubleshooting is begun.

1. Are Y2009's fuses (F1 and F2) OK?

2. Is Y2009's battery pack operational?

3. Is the Y2009's POWER CHARGER switch in the correct position for the desired operation.

PARTS LIST

A detailed parts beakdown for the Y2009 is provided in Table 4. Refer to Section 5 of the 2180A or 2190A Instruction Manual for specific parts ordering information.

Table 2. Recommended Test Equipment

EQUIPMENT NOMENCLATURE	REQUIREMENT	RECOMMENDED EQUIPMENT
Variable line Source	115V ac ±10% of nominal line voltage.	General Radio Variac
Digital Thermometer	Thermocouple Type	Fluke 2190A

Table 3. Troubleshooting Guide

STEP NO.	INSTRUCTION	YES	NO	GO TO
1	Has Y2009's Performance Test been completed?	3	2	
2	Complete Performance Test.			3
3	Has the Troubleshooting Set-Up procedure been completed?	5	4	
4	Complete Troubleshooting Set-Up procedure.			5
5	Remove Y2009's top cover and place CHARGER POWER switch to its ON (in) position.			6
6	Check voltage across R1. Is it approximately 1.2V dc?	8	7	
7	Check input power supply, U1 and CR2, replace if necessary.			6
8	Check voltage on collector of Q2. Is it approximately 12V dc?	10	9	
9	Check voltage on U2-2. Is it greater than or equal to the voltage on U2-3?	11	10	
10	Check R22, CR3, U2, R4 and C4. Replace if necessary.			11
11	Check U2. Replace if necessary.			12
12	Check voltage on collector of Q2. Is it approximately 12V dc?	14	13	
13	Check Q1, R5 and Q2, Replace if necessary.			14
	NOTE *To verify proper operation of the LO BTRY indicator (CR4), connect a jumper acress R9, the indicator should light. If not, check U2, Q3, R10, CR4 and its connection. Replace if necessary.*			
14	Battery charger is now functional.			

Table 4. Model Y2009 Battery Pack

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
	MODEL Y2009 BATTERY PACK	ORDER	MODEL	Y2009 BATTERY PACK	1		
A1	CHASSIS ASSEMBLY(2180A-4210)	ORDER	MODEL	Y2009 BATTERY PACK	1		
F1	FUSE,1/16 AMP,FAST ACTING	109348	71400	AGC1-16	1	5	Z
F1-1	FUSE,1/8 AMP,250V	196790	71400	AGC1-8	1	5	Y
F2	FUSE,3/4 AMP,FAST ACTING	109249	71400	AGC1-8	1	5	
H1	SCREW,6-32 X 5/8,FHP	114876	73734	18247	4		
W1	CORD SET(NOT SHOWN)	284174	89536	284174	1		

Y FOR 100/120V UNIT OPERATION USE ITEM F1-1,1/8 AMP FUSE. DISCARD ITEM F1,1/16 FUSE.

Z FOR 250V UNIT OPERATION USE F1,1/16 AMP FUSE. DISCARD F1-1,1/8 AMP FUSE.

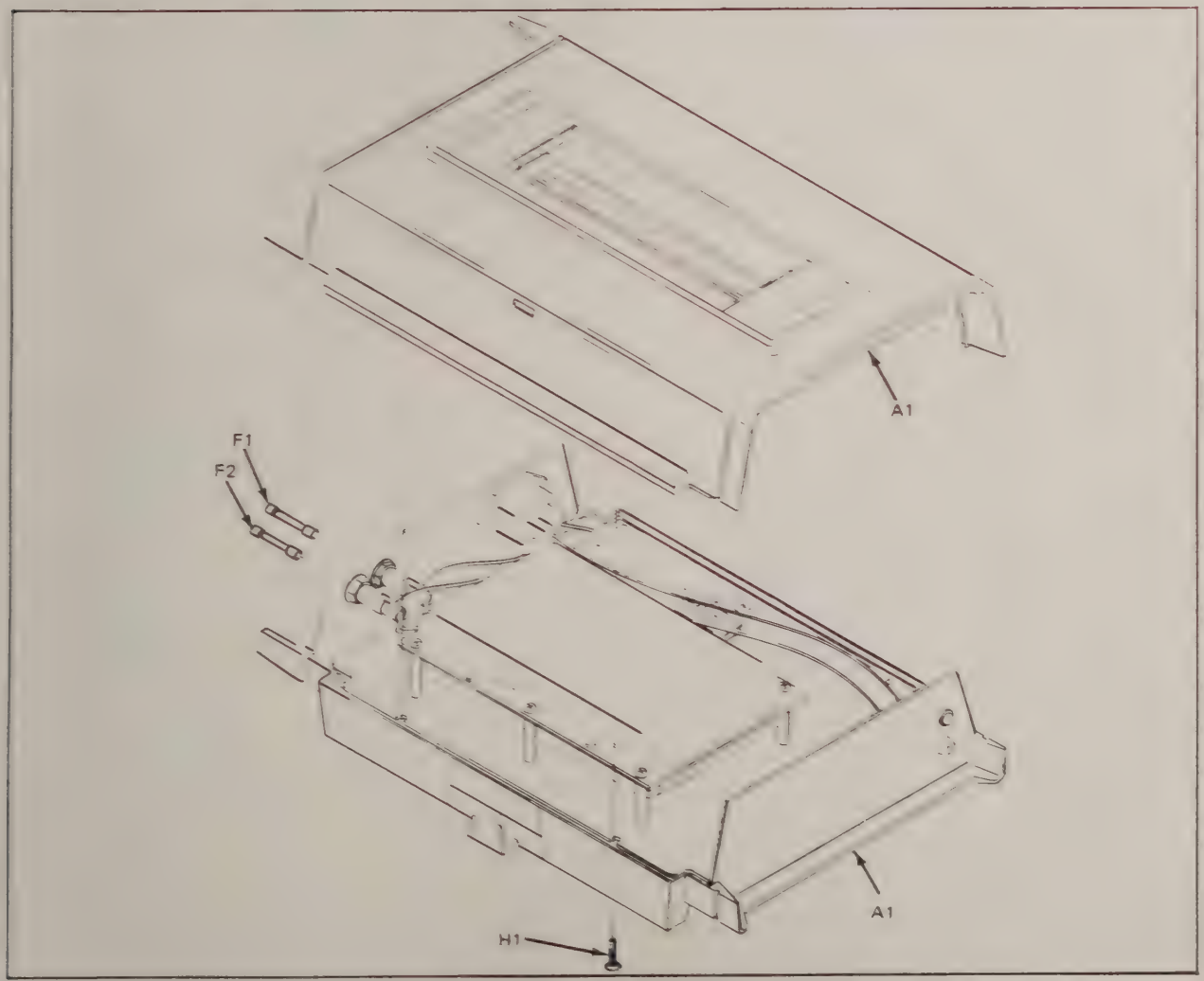


Figure 4. Model Y2009 Battery Pack

Table 5. A1 Chassis Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1	CHASSIS ASSEMBLY(2180A-4210)	ORDER	MODEL	Y2009 BATTERY PACK	1		
A1A1	BATTERY PACK ASSEMBLY(2180A-4010T)	ORDER	MODEL	Y2009 BATTERY PACK	1		
A1A2	BATTERY PACK(2190A-4202)	472365	89536	472365	1		
CR4	DIODE,LED	428623	12040	59NSL-5046	1	1	
H1	SCREW,6-20 X 3/8	288266	89536	288266	1		
H2	SCREW,PHP 6-32 X 3/8	385401	73734	23042	6		
H3	SCREW,FHP 6-32 X 5/8	335158	73734	22247	2		
MP1	BASE STANDARD	454702	89536	454702	1		
MP2	GUARD,BASE	464404	89536	464404	1		
MP3	LATCH,PTI	467548	89536	467548	2		
MP4	BAIL,PTI	467555	89536	467555	1		
MP5	FOOT,NONSKID	467571	89536	467571	4		
MP6	DECAL,FRONT PANEL	477422	89536	477422	1		
MP7	REAR PANEL	481861	89536	481861	1		
MP8	FRONT PANEL	475053	89536	475053	1		
MP9	DECAL,BASE SIDES	473652	89536	473652	2		
MP10	DECAL,BOTTOM	477430	89536	477430	1		
MP12	FUSE HOLDER CAP	460238	89536	460238	2		
MP13	COVER,"B" SIZE	454728	89536	454728	1		
MP14	GUARD COVER "B"	464172	89536	464172	1		
MP15	HANDLE,RETAINER	467563	89536	467563	2		
MP16	DECAL,RETAINER	473645	89536	473645	2		
MP17	HANDLE,PTI	454751	89536	454751	1		
MP18	FUSEHOLDER, BODY & NUT ONLY	375188	89536	375188	1		
W1	CABLE ASSEMBLY	475228	89536	475228	1		

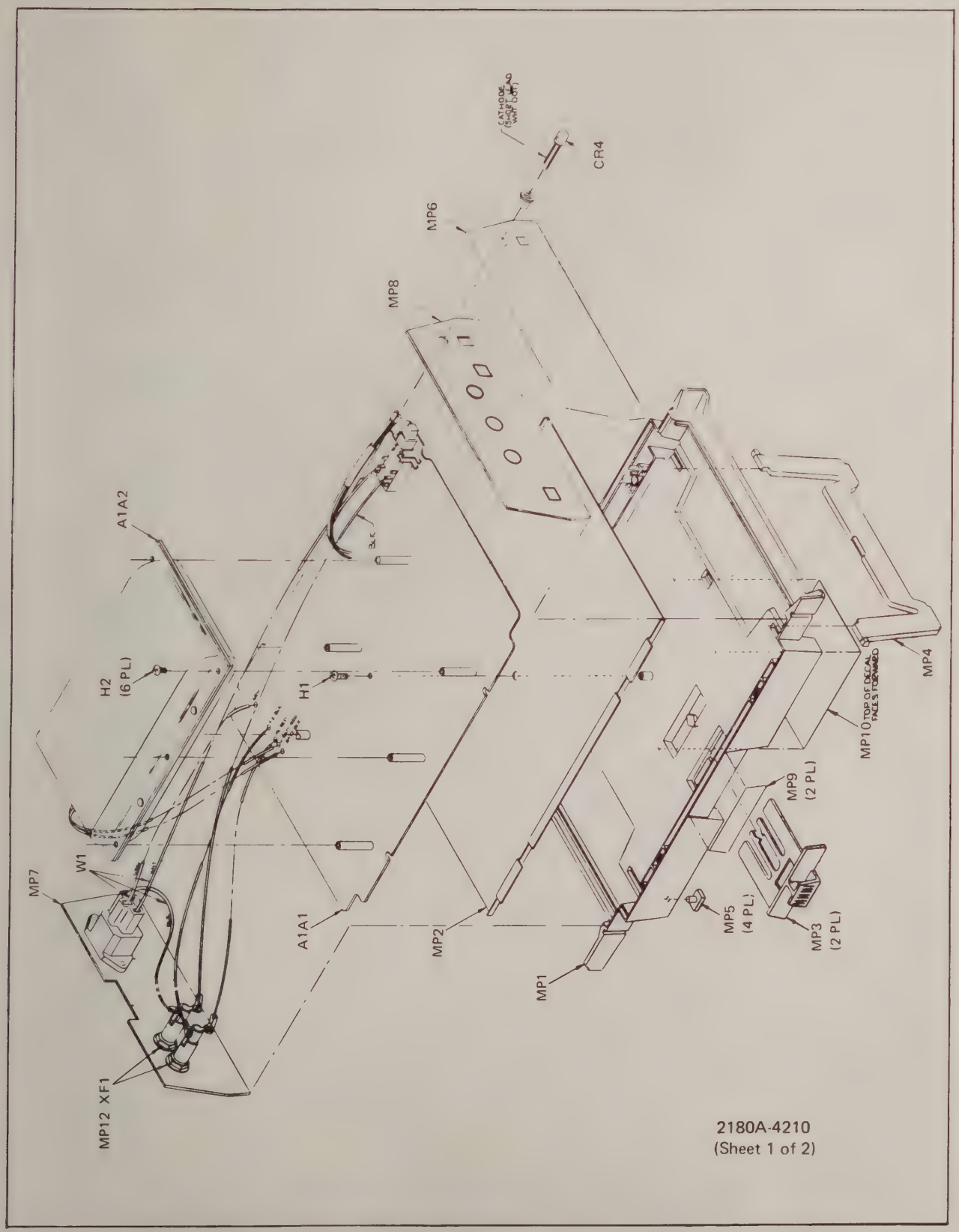


Figure 5. A1 Chassis Assembly

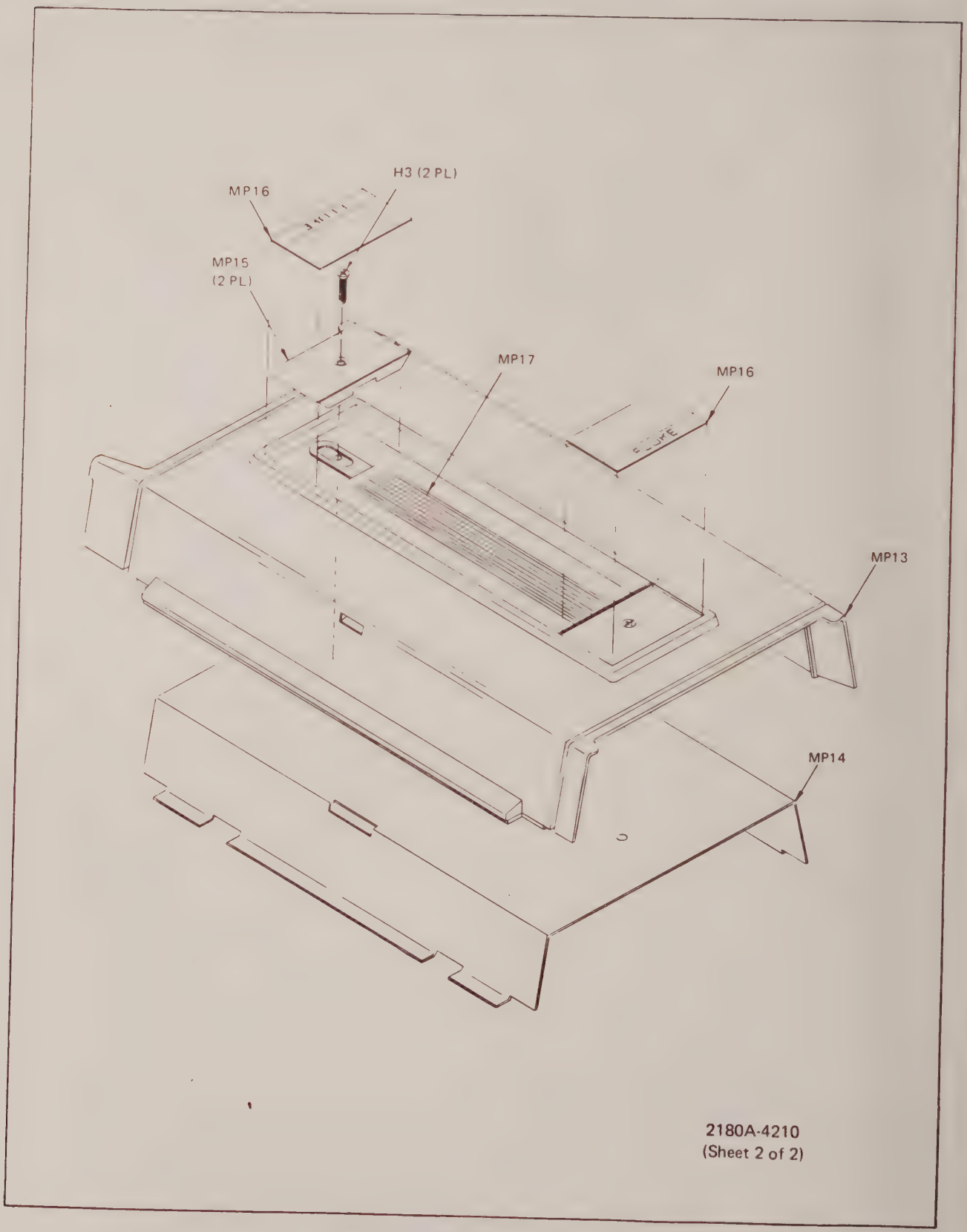


Figure 5. A1 Chassis Assembly (cont)

Table 6. A1A1 Battery Pack Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1A1	BATTERY PACK ASSEMBLY(2180A-4010T)	ORDER	MODEL	Y2009 BATTERY PACK	1		
C2	CAP,ELECT,470UF -10/+100%,40V	403030	80031	3050FJ501U050	1	1	
C4	CAP,TA,10UF +/-20%,20V	330662	56289	196D106X0020KA1	1		
CR1	RECTIFIER BRIDGE	392910	09423	FB100	1	1	
CR2	DIODE,SI,RECT	343491	01295	IN4002	1	1	
CR3	DIODE,ZENER	393579	07910	IN4567	1	1	
H1	RUBBER STRAP	104794	98159	2829-115-3	1		
H2	SCREW,PNH,4-40 X 1/4	256156	73734	23022	1		
H3	NUT,HEX,4-40	110635	73734	8003N	1		
H4	WASHER,LCK,SPLIT,#4	185710	89536	185710	1		
H5	SCREW,PNH,4-40 X 1/2	156380	73734	19033	2		
MP1	HEATSINK	414128	13103	6030B-TT	1		
MP2	SWITCHBUTTON	445197	89536	445197	1		
MP4	PRESSNUT	380196	24347	KF2-440	2		
Q1	XSTR,SI,PNP	195974	04713	2N3906	2	1	
Q2	XSTR,SI,PNP	478214	89536	478214	1		
Q3	XSTR,SI,PNP	195974	04713	478214	REF		
R1	RES,COMP,6.2 +/-5% 1/2W	218750	01121	EB62G5	1		
R2	RES,VAR,1K +/-10%, 1/2W	285155	89536	285155	1	1	
R3	RES,MF,14.3K +/-1%, 1/8W	291617	91637	CMF551432F	1		
R4	RES,MF,26.7K +/-1%, 1/8W	245779	91637	CMF552672F	1		
R5	RES,DEP CAR,680 +/-5%, 1/4W	368779	80031	CR251-4-5P680ET	1		
R6	RES,MF,6.65K +/-1%, 1/8W	294918	91637	CMF556651F	1		
R7	RES,MF,10K +/-1%, 1/8W	168260	91637	CMF551002F	2		
R8	RES,MF,7.68K +/-1% , 1/8W	370999	91637	CMF557681F	1		
R9	RES,MF,10K +/-1%, 1/8W	168260	91637	CMF551002F	REF		
R10	RES,DEP CAR,1K +/-5%, 1/4W	343426	80031	CR251-4-SP1KT	1		
R22	RES,MF,2.74K +/-1%, 1/8W	293761	91637	CMF552741F	1		
S2	SWITCH,SLIDE,DPDT	234278	82389	XW1649	2		
S4	SWITCH,SLIDE,DPDT	234278	82389	XW1649	REF		
T1	TRANSFORMER	464388	89536	464388	1		
TB1	TERMINAL BLOCK	479006	89536	479006	1		
U1	IC,LIN,ADJ,VREG	460410	01295	LM317KC	1		
U2	IC,LIN,LO-PWR,DUAL VOL COMPTR	478354	01295	LM393N	1		
W1	CABLE ASSEMBLY	480905	89536	480905	1		

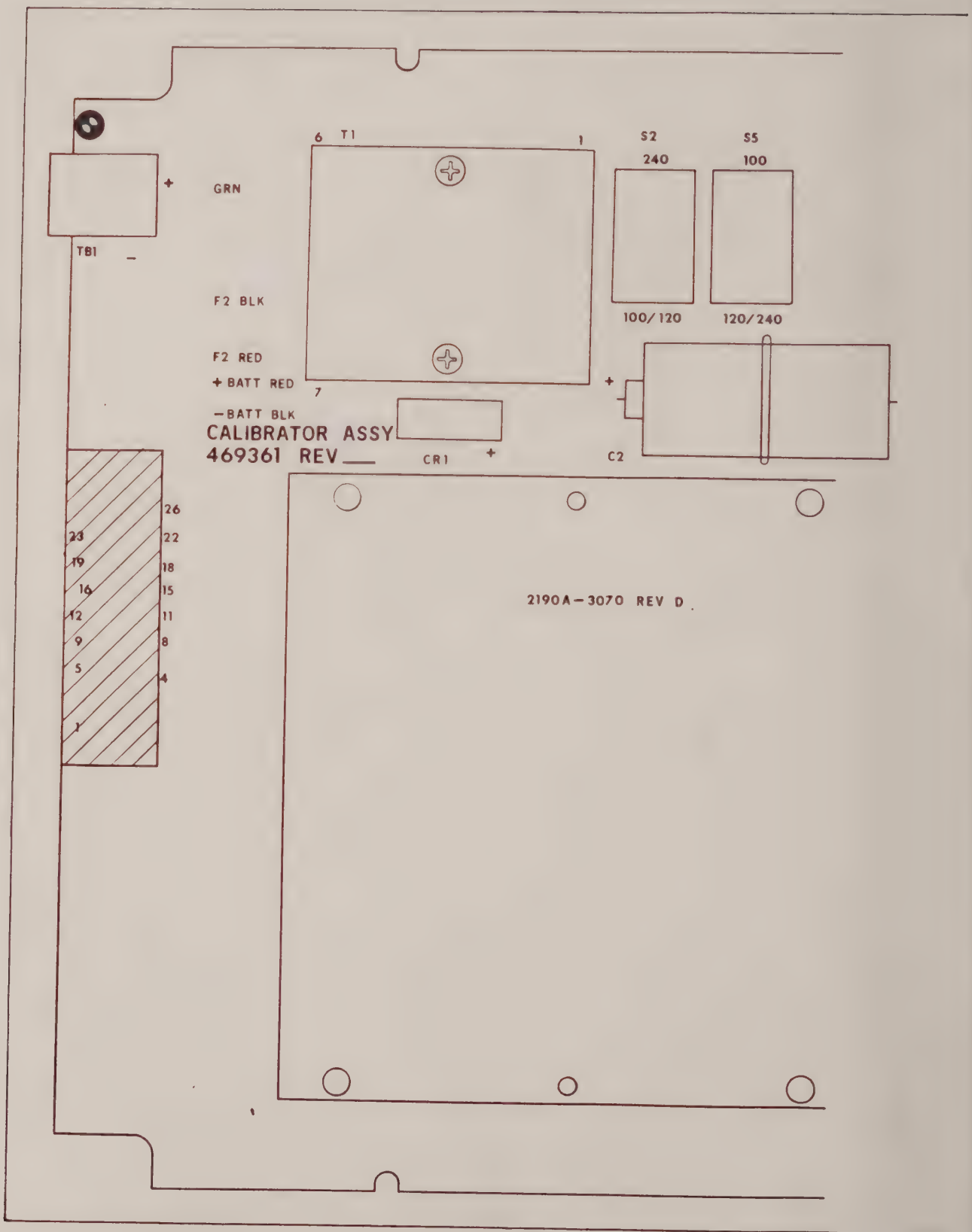


Figure 6. A1A1 Battery Pack Assembly

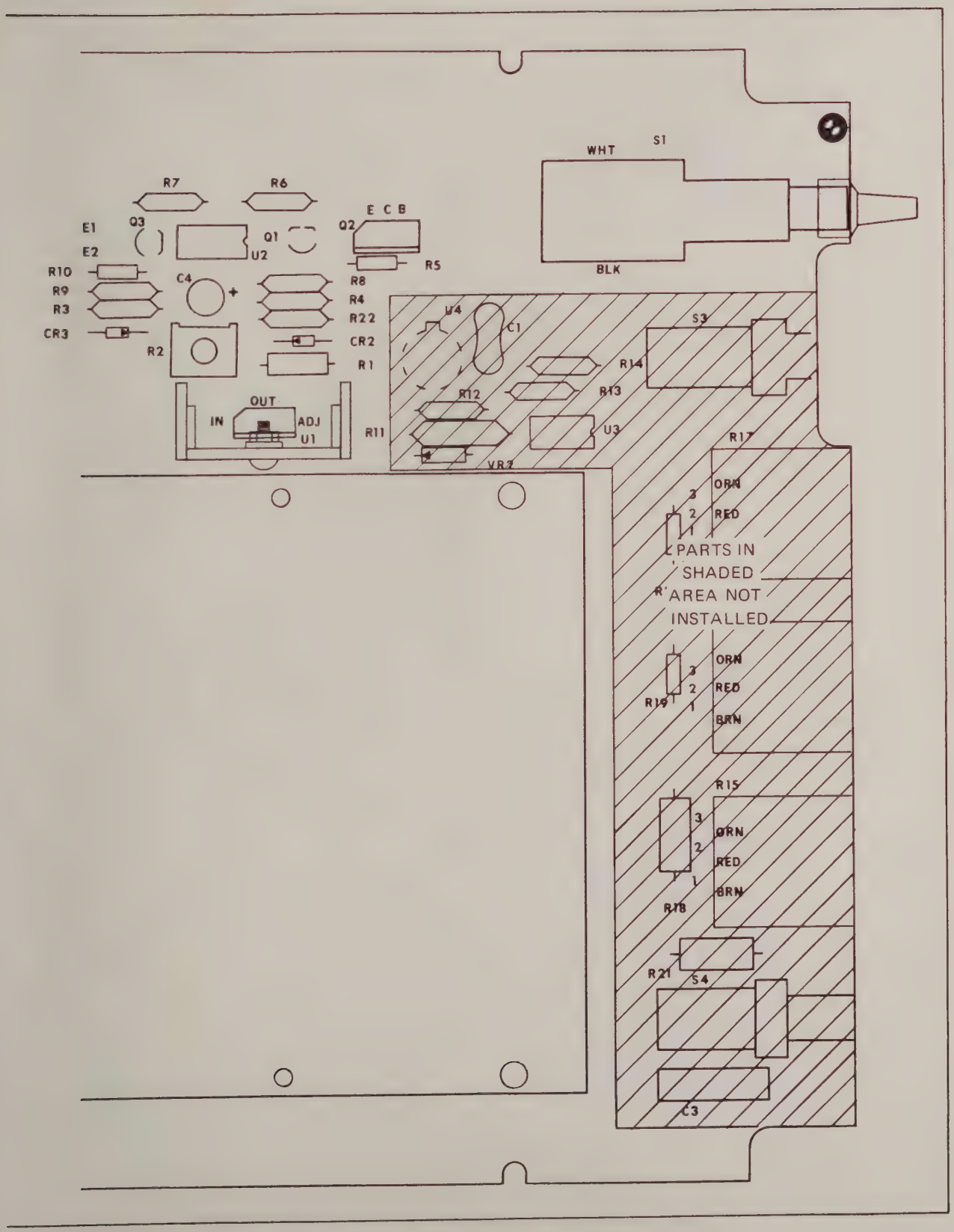


Figure 6. A1A1 Battery Pack Assembly (cont)

Table 7. A1A2 Battery Pack

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1A2	BATTERY PACK ASSEMBLY(2190A-4202)	472365	89536	472365	1		
B1	BATTERY,RECHARGEABLE	479147	06001	PPS7W092	1		
H1	RIVET, .1205 X 5/32	103424	12014	R3647X5-32	4		
MP1	BATTERY,HOLDER	476168	89536	476168	2		
MP2	FOAM SPACER	476150	89536	476150	1		

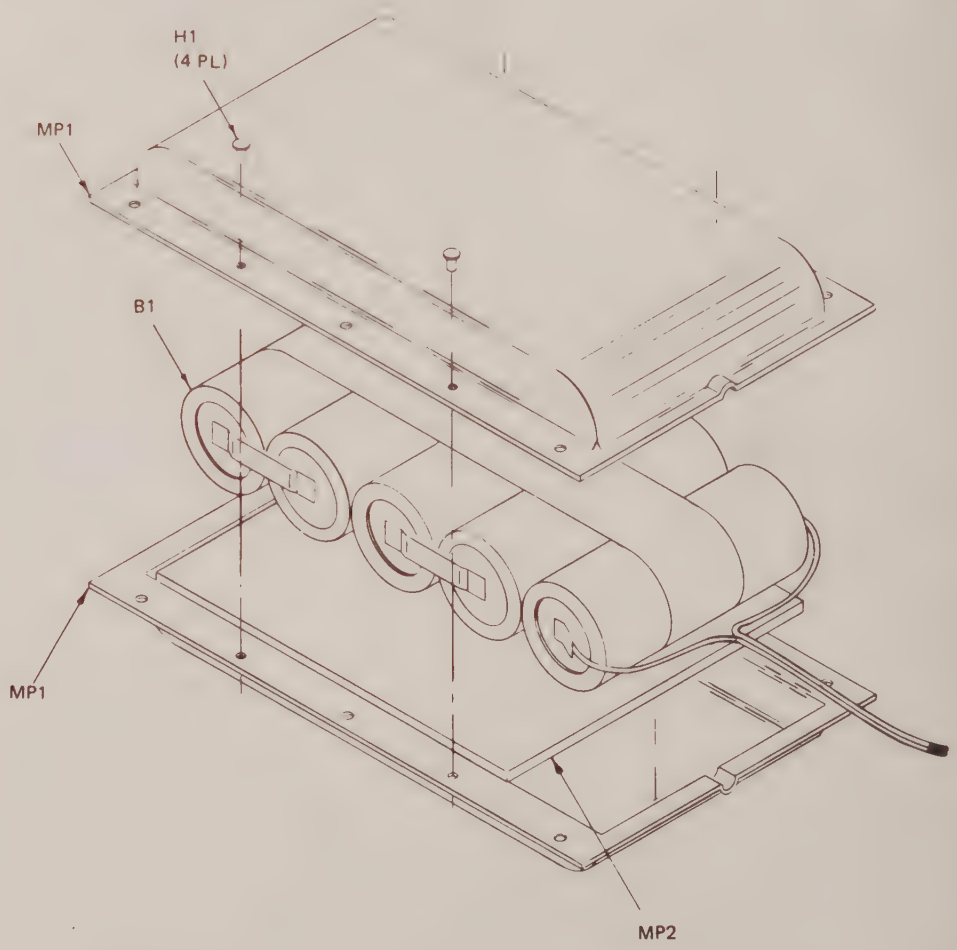
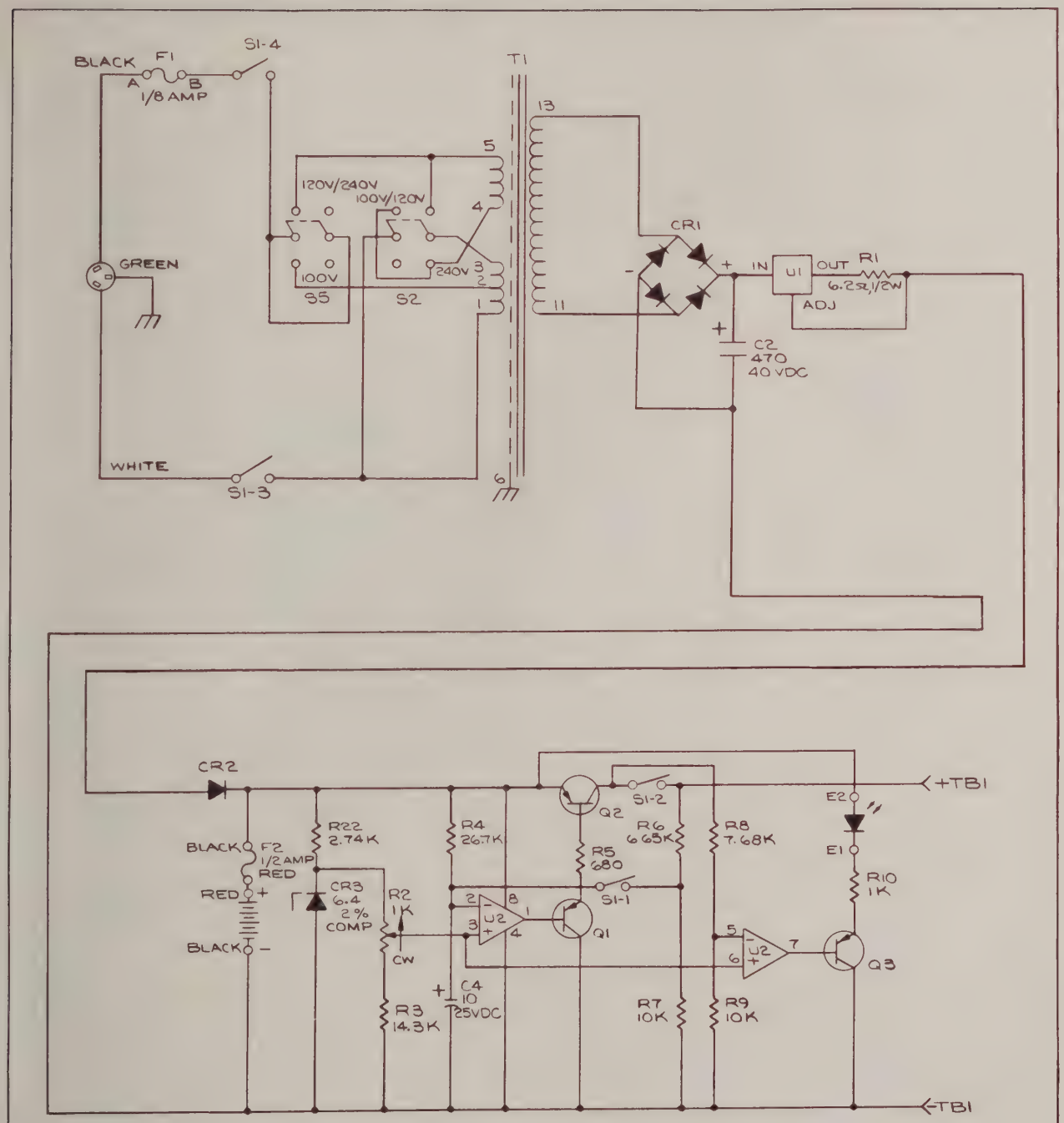


Figure 7. A1A2 Battery Pack



REF DES	
LAST USED	NOT USED
R22, C4, CR3, Q3, U2, F2, S5 T1,	R11-R21, C1, C3 S3, S4

NOTES:

3. ▽ DENOTES ANALOG COMMON.
   ▽ DENOTES DIGITAL COMMON.
   DIGITAL COMMON IS -15V WITH RESPECT TO ANALOG -COM
   ⏚ DENOTES EARTH GROUND
4. RESISTANCES ARE IN OHMS, 1/4W, 5% AND ALL CAPACITANCES ARE IN MICROFARADS.

Figure 8. Battery Charger Schematic

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Change/Errata Information

Issue No: 3 1/79

This change/errata contains information necessary to ensure the accuracy of the following manual. Enter the corrections in the manual if either one of the following conditions exist:

1. The instrument's PCB revision letter is lower than that which is indicated at the beginning of the change/errata.

2. No revision letter is indicated at the beginning of the change/errata.

MANUAL

Title: MODEL Y2003/Y2009
Print Date: JUNE, 1978
Rev and Date:

C/E PAGE EFFECTIVITY

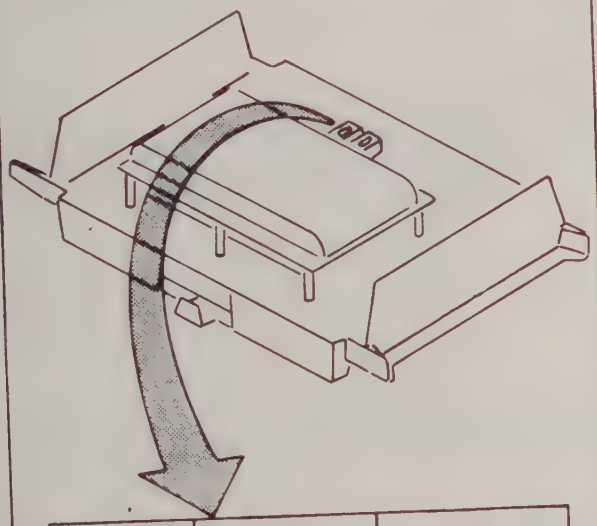
Page No.	Print Date
1	8/78
2	1/79
3	1/79

ERRATA #1

On Y2003, Figure 2 and Y2009, Figure 1 "Source Selection" make the following changes:

NOTE

To select line voltage place slot on each switch toward corresponding number on pcb; 100, 120, 220 or 240.



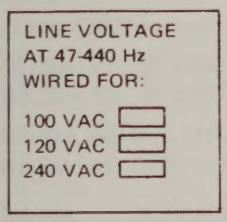
VOLTAGE	S2	S5
100V	SLOT 240 220 100 120	SLOT 100 220 120 240
120V	SLOT 240 220 100 120	SLOT 100 220 120 240
240V	SLOT 240 220 100 120	SLOT 100 220 120 240
220V	SLOT 240 220 100 120	SLOT 100 220 120 240

Figure 1. Source Selection

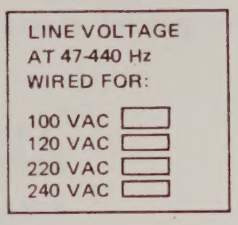
ERRATA #2

On page 4, change the Control, Indicators and Connectors Figure as follows:

FROM:



TO:



CHANGE #1–12007

On page 13, Table 6, for the Y2003 and page 7, Table 4, for the Y2009, make the following changes:

FROM: F2/Fuse, 3/4 Amp, Fast acting/109244/71400/AGC1-8/1/5
TO: F2/Fuse, 3/4 Amp, Slow-Blow/109256/71400/MDL3-4/1/5

ERRATA #3

On page 2, under Operating Notes for the Y2003 manual and page 1, under Operating Notes for the Y2009 manual, place the following note:

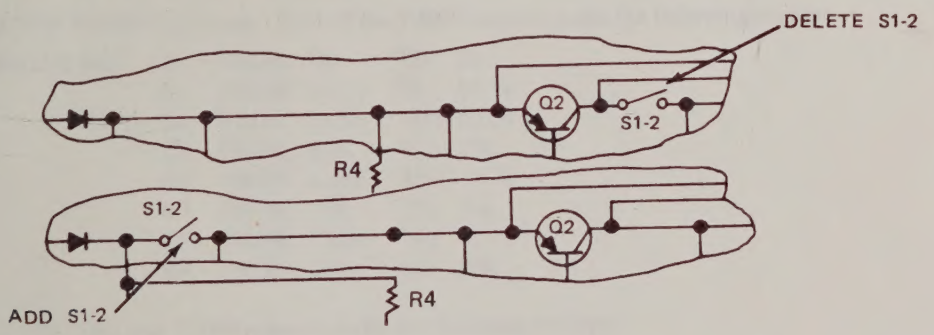
NOTE

For storage purposes the charger power switch must be pressed to its ON position (IN). This will prevent the low battery indicator from discharging the internal battery.

On page 22 of the Y2003 manual and page 15/16 of the Y2009 manual, make the following changes:

FROM:

TO:



ERRATA #4

On page 18 (Y2003) and page 11 (Y2009) make the following changes:

FROM: R2/Res. Var, 1k ±10%, ½W/285155/89536/285155/1/1
TO: R2/Res. Var, 1k ±10%, ½W/275750/89536/275750/1/1

CHANGE #2–12092

Rev. -F, A1A1, Calibrator Assembly (Y2003)
Rev. -B, A1A1 Battery Pack Assembly (Y2009)

On page 18 of the Y2003 manual and page 11 of the Y2009 manual make the following changes:

FROM: R2/Res, Var, 1k ±10%, ½W/275750/89536/275750/1/1
TO: R2, Res, Var, 2k ±10%, ½W/309666/89536/309666/1/1

FROM: R3/Res, mf, 14.3 ±1%, 1/8W/291617/91637/CMF551432F/1
TO: R3/Res, mf, 28.7k ±1%, 1/8W/235176/91637/CMF552872F/1

FROM: R4/Res, mf, 26.7k ±1%, 1/8W/245779/91637/CMF552672F/1
TO: R4/Res, mf, 53.6k ±1%, 1/8W/291401/91637/CMF555362F/1

FROM: R5/Res, dep car. 680 ±5%, ¼W/368779/80031/CR251-4-5P680ET/1
TO: R5/Res, dep car. 10k ±5%, ¼W/348839/80031/CR251-4-5P10K/1

FROM: R6/Res, mf, 6.65k ±1%, 1/8W/294918/91637/CMF556651F/1
TO: R6/Res, mf, 13.3k ±1%, 1/8W/296566/91637/CMF551332F/1

FROM: R8/Res, mf, 7.68k ±1%, 1/8W/370999/91637/CMF557681F/1
TO: R8/Res, mf, 15.4k ±1%, 1/8W/261651/91637/CMF551542F/1

FROM: R7 &R9/Res, mf, 10k ±1%, 1/8W/168260/91637/CMF551002F/2
TO: R7 &R9/Res, mf, 20k ±1%, 1/8W/291872/91637/CMF552002F/2

FROM: R22/Res, mf, 2.74k ±1%, 1/8W/293761/91637/CMF552741F/1
TO: R22/Res, mf, 5.49k ±1%. 1/8W/334565/91637/CMF555491F/1

FROM: Q2/Xstr, Si, PNP/478214/89536/478214/1
TO: Q2/Xstr, PNP, Pwr/483693/09214/D45E2/1

On page 22 of the Y2003 manual and page 15/16 of the Y2009 manual, make the following changes:

CHANGE VALUE OF:

R2,	FROM: 1k	TO: 2k
R3,	FROM: 14.3k	TO: 28.7k
R4,	FROM: 26.7k	TO: 53.6k
R5,	FROM: 680	TO: 10k
R6,	FROM: 6.65k	TO 13.3k
R7,	FROM: 10k	TO: 20k
R8,	FROM: 7.68k	TO: 15.4k
R9,	FROM: 10k	TO: 20k

On page 5, Table 1 of Y2003 and Y2009 manuals make the following changes:

FROM: ON/OFF
TO: BTRY PWR/CHARGE STORAGE

ERRATA #5

On page 1, paragraph 1, line 10, and page 3, paragraph "Offset Adjustment" line 6 and page 5, Table 1, item 3 for the Y2003 manual only, make the following changes:

FROM: 0 to 50°C
TO: 0 to a maximum of between 10° and 50° depending upon thermocouple type.

MP MASTER
MA30407